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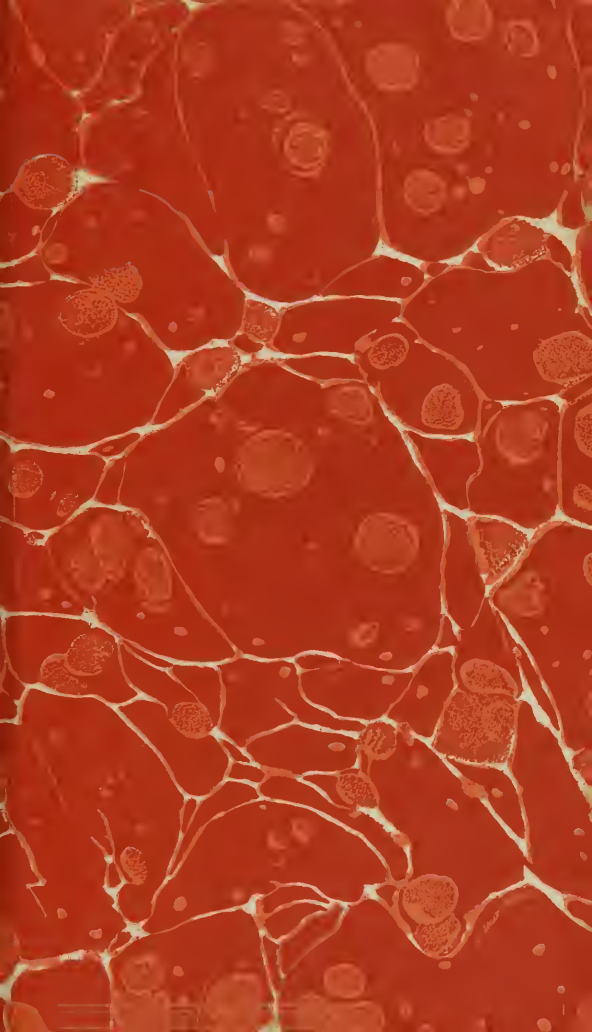
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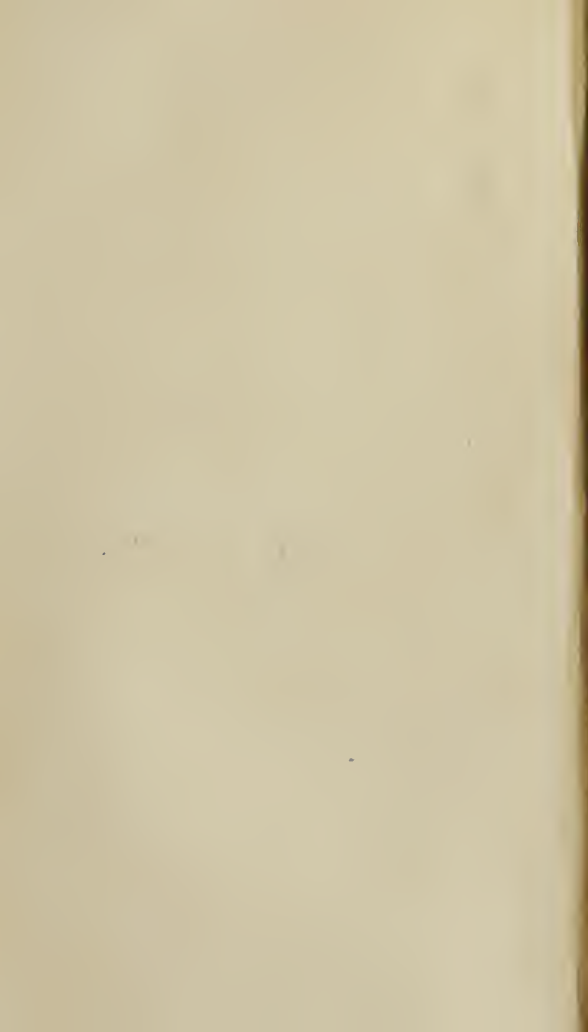
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A
CONCISE VIEW
OF
ALL THE MOST IMPORTANT FACTS
WHICH HAVE HITHERTO APPEARED
CONCERNING THE
COW-POX.

22509
BY C. R. AIKIN,

Member of the Royal College of Surgeons in London, and
Honorary Member of the Medical and Physical
Society at Guy's Hospital.

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PREFACE.

THE general interest which every novelty in the science of medicine excites in this country, whilst it affords a temporary success to impostures of every kind, produces this great advantage, however, that no very material improvement in the healing art, when once fairly brought before the bar of the public, is likely to sink into neglect, so long as it possesses such intrinsic value as really to merit the patronage of the candid and liberal part of the community.

It is to the credit of the inoculation of the cow-pox, that it has been introduced by no illiberal arts or impirical pretensions: on

the contrary, its supporters have contented themselves with laying before the public the event of experiments conducted with ability and perfect impartiality ; so all the reputation which the practice has hitherto acquired, may be considered as most fairly earned.

The zeal which is always kindled in a pursuit after novelty has here been confined to the laudable endeavor at exterminating a very serious and formidable disease, by suggesting, but not obtruding on the public, a mild and easy substitute.

The result of these inquiries has afforded such favorable testimony to the merits of this undertaking, that the vaccine inoculation has spread to distant parts of the kingdom and has been introduced into some neighboring countries of Europe under very favorable auspices ; and, in this island at least, there are few medical practitioners who

do not begin to turn their attention to this subject.

Under these circumstances I have thought that it would not be unacceptable to those who are interested in medical improvements, to present a concise view of the most interesting facts relative to the cow-pox in every form, and the practical directions to be followed during its inoculation. The following pages will perhaps be especially convenient to those who have not an opportunity of entering more at large into the subject, and consulting all the sources of information (which even now are not a few) in order to gain that general knowledge which may determine their practice. There are, it is true, several curious and important branches of inquiry, connected in a more distant manner with facts here mentioned, which it would be foreign from the purpose and extent of

this little work to notice. The reader who is fond of these interesting pursuits will find several valuable hints in the excellent works that have afforded the materials for this compilation ; so that both a considerable immediate benefit to the health of mankind which the vaccine inoculation promises, and the light which may be thrown by its means upon the subject of contagion in general, render it highly worthy of the public attention.

Broad-Street Buildings.



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COW-POX.

CHAPTER I.

OF THE
NATURAL OR CASUAL COW-POX.

IN several parts of this kingdom where cows are kept for the purposes of the dairy, a peculiar eruptive disease has been occasionally observed among the herd, affecting the udder and teats of these animals, which has pretty generally obtained the name of the *COW-POX*.

Till within these last two years, the knowledge of this distemper has been chiefly confined to the persons immediately employed in the dairies, and to farriers and cow-doctors practising in the neighborhood ; but, by the latter, it appears to have been observed with considerable accuracy, and judicious means to have been employed for its removal.

Wherever it has been known, however, the circumstances which now render it an inquiry of the most interesting kind have likewise been remarked : they are that the disorder is communicated, by actual contact, to the milkers who handle the teats of the diseased cows, and from them again is often spread through a nu-

merous herd ; that, when affecting the human species, it is not merely confined to the local disease of the hands and arms, but also occasions a general indisposition, often severe, but never fatal, which runs a regular course ; and that the person who has once undergone it, is ever after secure against the infection of the small-pox, either in the natural way by contagion, or by inoculation.

These circumstances, especially the latter, appear to have been known, time out of mind, to the inhabitants of the particular districts where the disease has from time to time appeared, and only to these ; a fact worthy of note in the history of the spread of human knowledge, and

which might perhaps appear improbable, if we were not assured that the supposed Oriental method of inoculation for the small-pox, soon after its introduction into England as a foreign invention, was discovered to have existed from time immemorial in a corner of South Wales not very obscure or unfrequented.*

The above mentioned facts relating to the cow-pox have at different times been casually communicated as curious circumstances in the history of disease, to some men eminent for their researches into physiology. However, they failed to excite that

* See Dr. Woodville's *History of the Inoculation of the Small-Pox*, a work replete with curious and valuable matter.

high attention which they deserved; till, in 1798, Dr. Jenner of Berkeley in Gloucestershire (a district celebrated for the extent and excellence of its dares) published several highly curious and interesting particulars concerning this disease,* which have fully presented it to general notice, and will not fail to place his name on the honorable list of public benefactors.

The subject having been since illustrated by further remarks and ex-

* See Dr. Jenner's *Inquiry into the Causes and Effects of the Variolæ Vaccinæ*, &c. London, 1798; which interesting work it is unnecessary here to refer to continually, as a great part of its contents have been incorporated in the following pages.

periments, both by the same author,* and by other medical practitioners of acknowledged abilities, it may fairly be regarded as no longer in its infancy, and may claim from the public the attention due to every thing in which the general welfare is decidedly interested.

I. OF THE

COW-POX AS AFFECTING COWS.

THE cow, though in general a healthy animal, is subject to some peculiar diseases, many of which she probably owes to her domestication

* See *Further Observations on the Variolæ Vaccinæ*, 1799, by Dr. Jenner; and *A Continuation of Facts and observations relative to the Variolæ Vaccinæ*, 1800, by the same.

and intimate connection with man. Some of them have their seat in the udder, especially whilst it is performing the important office of the secretion of milk ; and these it is now become of peculiar consequence to attend to, and to discriminate with accuracy.

From the observations of those who are the most conversant with this animal, it appears that there are several causes which may produce sores upon the udder and teats, especially such as excite any irritation upon those organs during the season when the secretion of milk goes on with the greatest vigor. The stinging of flies, rough handling during milking, and other external irrita-

tions of this kind, will often occasion small white blisters on the parts, which, however, never extend more than skin-deep, and generally are very easy of cure.

Another, and a more serious disorder in these parts, is sometimes produced by suffering a cow, while in full milking, to remain for a day or two unmilked in order to distend the udder when naturally small. This is a common artifice practised at fairs and cattle markets, in order to increase the price of the cow, as a large udder is reckoned an important point in the value of the animal. By this cruel and unworthy fraud, the vessels that supply this organ are kept for an unusual length of time in a

state of high distention, and this frequently terminates in violent inflammation of these parts, succeeded by large eruptions over the teats and udder, which sometimes leaves deep and troublesome sores. The matter discharged from these ulcers will communicate a similar pustular disorder to the hands of the milkers, when the skin is broken in any part; and often effects them with foul and extensive ulcers that sometimes occasion pustules on the arms and shoulders, and prove tedious and difficult of cure. A suppression of the milk in puerperal women often affords a parallel instance of the formation of abscess, though in them the progress

and form of the local disease is somewhat different.

But the genuine cow-pox is a distinct disease from those which have been hitherto mentioned. It generally makes its appearance in the spring, and shows itself in irregular' pustules on the teats or nipples of the udder. They are at first of a palish blue, or rather a livid color, and contain a thin watery acrid fluid. The surrounding parts are swelled, hardened, and inflamed. These pustules are very apt, unless timely remedies be applied, to degenerate into deep eroding ulcers, which *eat into the flesh*, as the cow-doctors very properly term it, and constantly discharge a matter which commonly grows thicker as

the disease lasts, and hardens into a scab. Now and then the cow becomes generally indisposed, loses her appetite, and gives less milk than usual; but it often happens that the disorder, though very severe, is entirely local. With regard to the circumstance of yielding less milk, it may be observed, that this may perhaps be partly owing to the pain given in drawing the nipples; for the cow seems to have some voluntary command over the yield of milk. It is a well known fact in dairies, that a person who has a soft hand in milking will draw more from the udder than one who handles it roughly.

The cow-doctors generally succeed in checking this disorder in its earlier

stages, by applying to the fore some strong and rather corrosive metallic solution, such as that of white or blue vitriol. The cow-pox never proves fatal to cows, nor is it infectious in the usual manner of contagious distempers, but can only be communicated to them, or to men, by actual contact with the specific matter from the fores. Hence it is, that cows which are not in milk escape the disease entirely, though constantly in the same field with those that are highly infected; and, as far as observations have hitherto been made, it is only from the circumstance of the milker handling the teats of the sound cows immediately after touching those of the diseased cattle, and receiving

thereby on his fingers some of the matter discharged from the sores in their udders, that the cow-pox ever spreads among the herd. This will explain another observation which has been made, which is, that the infection will often keep long confined to the cattle of a single farm, in the midst of other herds, and only separated by a hedge, since particular milkers are employed in each. Both cows and men may suffer under this disorder repeatedly, but, after the first time of infection, the succeeding attacks are generally much less virulent (to the human species at least) and much easier of cure.

The cow-pox is more particularly distinguished from the lighter sores

of the udder by having a great tendency to produce a deep hollow sore ; and differs from the other ulcerations of this organ, by a livid blueness which constantly attends it, and perhaps by a peculiar characteristic appearance which is only to be learnt by actual observation.

This disease, in its natural state, is only partially known throughout the country, but is pretty widely diffused ; and, wherever it has been traced, the opinion of its being a preservative against the small-pox, when extended to the human subject, seems to be equally prevalent. The cow-pox is familiar to the inhabitants of that highly valuable and celebrated dairy country, the Hundred

of Berkley in Gloucestershire, where, fortunately for the public, it attracted the attention of Dr. Jenner. It has likewise been discovered in various parts of the counties of Wilts, Somerset, Buckingham, Devon, and Hants; in a few places in Suffolk and Norfolk, where it is sometimes called the *Pap-pox*,* and in Leicestershire and Staffordshire.

It is not unfrequent in the very large milk farms contiguous to this metropolis, on the Middlesex side. It is here observed generally to at-

* See *An Inquiry concerning the History of the Cow-pox*, by Dr. Pearson, whose early attention to this subject, and zeal in the prosecution of it, have much contributed to the interest which it has generally excited.

tack first some cow newly introduced into the herd, and is supposed to originate in a sudden change from a poor to a very rich and partly unnatural diet, which it is the practice to use in order to bring the yield of milk to its highest point. The cow-pox has likewise been known in Ireland, from time immemorial, and in the neighborhood of Cork, is called *Shinagh*, a term which belongs to the ancient language of the country, and appears to have been applied to this disease, as far back as oral testimony can be carried.* It has not yet been traced to the extensive dairies of Cheshire, or to any of the northern

* See the *Medical and Physical Journal*, vol. iii. p. 503, and vol. iv. p. 425.

counties. Probably, however, it will be frequently detected in a much greater number of places than have hitherto been found ; for those that have been just mentioned include a considerable variety of country, and the disease has in general been rather concealed by the servants, and milkers, as throwing some imputation on the neatness and good order of their dairies. Besides, as it is not a native of towns and does not naturally fall under the eye of the more observing part of the community, and as its powers of contagion are very limited, and little calculated to excite alarm or general attention, the industrious inquirer has a fair field open to him

for collecting much new and valuable information.

The history of the cow-pox would be imperfect, without mentioning the following very singular origin which has been attributed to it by Dr. Jenner. The horse is well known to be subject to an inflammation and swelling in the heel called the *grease*, from which issues a very acrid matter capable of exciting irritation and ulceration in any other body, to the surface of which it may be applied. This matter is supposed to be conveyed to the cow by the men servants of the farm, who, in several of the dairy counties, assist in milking. One of these, having dressed the horse, goes immediately to bear his part in milk-

ing ; and, having some particles of the discharge from *the grease* upon his hands, he thus applies it to the udder of the cows ; where, if the animal be in a proper state for receiving the infection, it produces that specific change upon these parts, which gives rise to the disease of the cow-pox.

The origin here ascribed to this disorder is principally founded on the circumstance that, wherever the cow-pox appears, *the grease* is generally found to have preceded it ; and the opinion of the propagation of the disease from the horse to the cow is likewise as commonly current in some of the dairy countries, as those other observations concerning the disease which have been confirmed by accu-

rate examination. Still, however, we must as yet consider this as one of the most dubious of all the facts that have been advanced on the subject ; and nothing but positive experiment can give much assistance in an inquiry pursued in a path so little trodden, as that of the particular modifications which a disease assumes, by passing through animals of different species. Among the collateral advantages to be derived from this subject, though not immediately connected with the adoption of the cow-pox in medical practice, we may expect with some confidence to receive some new ideas upon several momentous questions which regard conta-

gion in general ; a subject highly interesting to the physiologist.

It may be mentioned, that, as soon as this opinion concerning the origin of cow-pox was started by Dr. Jenner, attempts were repeatedly made, to introduce the disease in the nipple of the cow by direct inoculation of the recent matter of *grease* from the horse's heel. The consequence, (when any) which followed this operation, was a slight inflammation, and the production of a small pimple or pustule, the common effect of a wound made with any poisoned instrument, but which disappeared in a few days, without exciting the specific disease of the cow.

pox. The failure of these first experiments, however, could by no means overthrow the opinion which, if successful, they were meant to establish ; since it seems to be fully ascertained that a certain predisposition in the constitution of the cow to receive the disease is also requisite for its production ; and hence it first appears in farms only at certain seasons, chiefly the spring, though, when once it has got footing in the herd, it will probably be communicated by contagion at any time.*

* Later experiments have decided this point, for Mr. Tanner of the Veterinary College has actually succeeded in producing the disease on the nipple of the cow by inoculation with limpid matter, from the *grease* of a horse's heel, and the vaccine pustule thus produced was proved to be genuine, by infecting again both human subjects and cattle.

We may add, that the matter discharged from the fores in the horse's heel is likewise found to occasion, at times, very troublesome ulcers on the hands of the men that dress it, attended with a very considerable degree of indisposition ; both of which appear to be full as severe as in the genuine cow-pox, and in many points to resemble this latter disorder. However, the person who has been infected by the horse, is not rendered thereby entirely secure from afterwards receiving the small-pox ; though it is certain that his liability to receive this contagion is much lessened.*

On the whole, therefore, though we cannot reasonably doubt that the

* See Jenner, parts 1st. and 2d.

matter of greafe may often be the parent of cow-pox, yet it still remains to determine, whether this is always the cafe. The frequent appearance of cow-pox, apparently in a fpontaneous manner, in f Situations and circumftances very remote from any connection with the difeafed horfe, have been often urged with great force and unanfwerable weight againft admitting as an univerfal truth, the origin afcribed to the cow-pox by Dr. Jenner.

II. OF THE
*CASUAL COW-POX AS AFFECTING THE HU-
MAN SPECIES.*

Thofe puftular fores on the udder and teats of the cow, which confi-

tute the genuine cow-pox, (whatever be the way in which they are produced) are found, by undoubted experience, to possess the power of infecting the human subject, when any part of the body, where the skin is broken or naturally thin, comes into actual contact with the matter which they discharge. Hence it is that, with the milkers, the hands are the parts that acquire this disorder accidentally, and it here exhibits the following appearances: Inflamed spots begin to appear on the hands, wrists, and especially the joints and tips of the fingers; and these spots at first resemble the small blister of a burn, but quickly run on to suppuration. The pustule is quite circular, de-

pressed in the middle, and of a blueish color, and is furrounded with a considerable redness. The blue color which the pustule almost invariably assumes, when the disorder is communicated directly from the cow, is one of the most characteristic marks whereby the genuine cow-pox may be distinguished from some other diseases which the milkers are likewise liable to receive from the cow. The matter of the pustule is at first thin and colorless; but, as the disorder advances, it becomes browner and more purulent. In a few days from the first eruption, a tenderness and swelling of the glands in the arm-pit come on, and soon after, the whole constitution becomes

disordered, the pulse is increased in quickness, and to this succeed shiverings, a sense of weariness, and aching pains about the loins, vomiting, headache, and sometimes even a slight degree of delirium.

These symptoms continue with more or less violence from one day to three or four, and, when they subside, they leave ulcerated sores about the hands, which are very apt to become ill-conditioned and heal very slowly; resembling, in this respect, the ulcers on the nipple of the cow, from which they originate.

It is to be observed, that the cow-pox eruption, though very severe on the hands, and though occasioning much general illness, never produces

a spontaneous crop of pustules over distant parts of the body, as the small-pox does. It does, indeed, often happen, that pustules are formed in various places which accidentally come in contact with the diseased hands, as on the nostrils, lips, and other parts of the face, where the skin is thin ; or sometimes on the forehead, when the milker leans with that part upon the udder of an infected cow.

From this account, it appears that the cow-pox, as it affects the milkers, or what may be termed the *casual* cow-pox in the human species, is often a severe disorder, sometimes confining the patient to his bed during the period of fever, and gen-

erally leaving troublesome sores ; but it has never been known to prove fatal ; nor are these sores, if properly attended to, followed with any lasting injury of the affected parts, though they sometimes leave scars for life.

THE very accurate investigation which this disorder has lately undergone, has established some very important points relative to its peculiar nature, which require to be particularly noticed, as upon them is founded the prospect of invaluable benefit which may arise to the public at large from substituting the inoculation of this disease to that of the small-pox.

The following facts may be considered as fully ascertained by the fairest experiments and most accurate observations :

First. The cow-pox in its natural state, or, when propagated immediately from an infected cow to the hands of the milkers, is capable of affecting the human species repeatedly to an indefinite number of times ; but, after the first attack, it is generally much milder in its symptoms, and especially it is much less liable to produce the fever and general indisposition which always attend the first infection. There are instances, however, where the second, and even the third attack has been as severe in every respect as the first ; but these are very rare.

Secondly. The small-pox in a considerable degree secures a person from the infection of the cow-pox, and in this respect appears to act in a manner very similar to a previous attack of the latter disease; that is, to confine its operation to the formation of local pustules, but unattended with general fever. Hence it is, that where all the servants of the dairy take the infection from the cows, those of them who have previously undergone the small-pox are often the only persons among them able to go through the usual work.

Thirdly. The cow-pox, in its genuine state, when it has been accompanied with general fever, and has

run its regular course, ever after preserves the person who has been infected with it from receiving the small-pox in any manner in which this distemper can be communicated. This most important fact, which has been the subject of popular observation in several parts of the kingdom, long before the introduction of the cow-pox in medical practice was thought of, and therefore has the stamp of *unbiassed* evidence, may be now asserted with that confidence which is given by the uniform result of the most candid examination, conducted with scrupulous care, carried to a considerable extent, and authenticated by testimony of many years

standing.* This assertion is however to be taken with exactly the same limitations as that of one infection with the small-pox preventing a second attack of the same disease. No previous infection will entirely counteract the local effect on the arm, produced by the insertion of variolous matter in common inoculation ;

* See Jenner, Woodville, Pearson, and every other writer on the subject, for numerous cases to this point. Those from the dairy countries of persons who took the cow-pox when young, by milking infected cows, and afterwards were frequently exposed to the variolous contagion in every possible way, are among the most striking and decisive examples. In several cases related by Dr. Jenner, the distance of time between the first infection and the subsequent attempts to infect, has been twenty, thirty, and even fifty years.

this may in a few cases even go so far as to induce a degree of general fever, slight indeed, but perhaps equal to that of the mildest indisposition caused by a first infection with this disorder. By the inoculation of either disease, however, the small-pox is equally and completely disarmed of its virulence against any subsequent attack ; which, in fact, is the circumstance which renders this operation so peculiarly desirable.

Fourthly. A comparison of the two diseases as to the mildness of their symptoms, and the hazard to life which they may occasion, will show a very decided advantage in favor of the cow-pox. Compared

with the natural small-pox, the natural or casual cow-pox is both milder, and beyond all comparison safer; as no fatal instance of the cow-pox as it affects the persons employed in dairies, has ever been recorded. When both diseases are introduced by artificial inoculation, they are each rendered much less severe, and here too the cow-pox preserves the same superiority as a safer and milder disease.

Fifthly. The cow-pox even in its most virulent state, is not communicable by the air, the breath, by effluvia, or in short, by any thing which constitutes *contagion* in the general estimation of this term; but can

only be propagated by the actual contact of matter from a cow-pox pustule, with some part of the body of the person who receives it. We cannot exactly determine whether in all cases an *insertion* of the specific virus under the skin be necessary; at least we know that when the infecting matter is in its most active state, as it is when formed in the cow's udder, the vascular skin which covers the lips and nostrils readily takes the infection without being broken. In this respect therefore the cow-pox virus seems to equal that of the small-pox in activity, for the latter will readily produce the disease when merely introduced within the nos-

tril ;* but the striking difference between the two diseases in the non-contagious nature of the cow-pox is a fact that is fully and satisfactorily ascertained. In the dairy farms, infected servants sleep with the uninfected ; infants at the breast have remained with their mothers whilst only one of the two have had the disorder upon them,† and in no instance has the disease of the one been communicated by contagion to the other.

* This is the method of inoculating in some of the eastern nations.

† Mr. Henry Jenner gives his testimony to this fact from experiments made by him for this express purpose.

A REVIEW of the facts that have been advanced will show a number of points in which the small-pox resembles the cow-pox in a very striking manner; but it will at the same time mark a very decided difference in others. Both the diseases are pustular, that is, they produce inflammations of a small extent, which gradually increase, and naturally and spontaneously terminate in the formation of matter: they both agree most strikingly in occasioning general fever, which comes on whilst the pustules are advancing towards a state of suppuration; and they show a considerable similarity of nature by

the change which each makes upon the constitution, so as in one case entirely, in another, to a considerable degree, to prevent the body from receiving the same or the other disease a second time. Another point of resemblance is, that each disorder is rendered much milder by inoculation, which likewise observes in each nearly the same period in its various changes ; also, that some and the same persons resist entirely each infection from some peculiarity in the constitution, which cannot be explained ;* and lastly, that a certain pro-

* Dr. Woodville, whose experience on this subject carries the highest authority, estimates the number of those that resist common inocu-

gressive advance of the local affection, together with the regular accession of the febrile symptoms at a stated time, is requisite in each, in order to produce that change upon the animal frame which tends to prevent a recurrence at any period of life.

With regard to the points in which the two diseases differ, some are only in degree ; as, that the small-pox entirely prevents its own recurrence (one or two rare cases excepted) but only partially renders the constitution unable to receive the cow-pox : and *vice versa*, that the cow-pox com-

lation for the small-pox to be about one in sixty, and these also resist the reception of the cow-pox. *Observations on the Cow-Pox.*

pletely preserves the body from the infection of the small-pox, and makes it only less susceptible of a repetition of the same disease. But the most striking point of difference, and that which renders the cow-pox so peculiarly valuable as a substitute for the other, is, its not being communicable by effluvia, or by any other method than by actual inoculation or contact with the specific pustular matter. It is this circumstance which gives it its great importance, considered in an enlarged and extensive view-; since, by adopting this disease to supply the place of the small-pox, all the dread and all the mischief that is occasioned by the unseen agency of an active and

formidable contagion is entirely removed ; no anxious precautions are required in order to avoid and insulate an infected person, whose breath can spread disease on every side ; and thus too the time of communicating the infection, which is ever after to afford complete security against the variolous contagion, may be selected so as at all times to secure the most favorable condition of the body.

CHAPTER II.

ON THE INOCULATED COW-POX.

EVERY one is acquainted with the important distinction which exists between the small-pox as propagated by contagious effluvia, and that communicated by artificial insertion of matter beneath the skin ; and the decisive advantages which the *inoculated* disease possesses over the *natural* are universally acknowledged, though the precise cause of the superior mildness of the former is as yet but imperfectly known.

The comparison between this disease and the cow-pox entirely fails in the circumstance of contagion ; for, as has been before observed, the latter has never been observed to be communicated in this method ; and therefore, too, the term *natural* cow-pox cannot be employed in the same distinctive sense, as when applied to the variolous infection.

It is a curious and important fact, however, that the operation of inoculating with the cow-pox virus, performed in the same method as is usually practised with that of the small-pox, appears to produce a very similar change with regard to rendering the disease more uniformly mild

and favorable ; though it cannot, like the other, shorten the period between the first moment of infection and the time of affecting the constitution in general, since the cow-pox in its most natural state, as it affects the milkers of diseased cattle, is really received by a kind of inoculation, though accidental.

Therefore, as some very characteristic differences in the form of the disorder depend on the mode in which the cow-pox is introduced into the human system, we may be allowed to mark that distinction by employing the term *natural* or rather *casual*, cow-pox in the human species, to express that disease which is contract-

ed by those who, in milking, handle the teats of an infected cow ; and using the phrase *inoculated* cow-pox, to imply that disorder which is excited by the artificial introduction beneath the skin of some of the specific matter secreted by a cow-pox pustule either in the cow, or more commonly in another human subject. As it is this form of the cow-pox with which the public are, and will be, the most concerned, and which will probably be adopted to assume a conspicuous place in medical nosology, there will be no great impropriety in confining to this form the term *vaccine* disease, which will express its origin from the cow, though probably it may never be

again necessary to return to the parent stock in this animal.

In treating of this disease as communicated by inoculation, it is first necessary to show that, in this form of the disorder, all the advantages are insured which attend the casual cow-pox ; and it is not difficult to prove that the disease is as much the same in these two forms, as that the natural small-pox is the same distemper as the inoculated. In the cow-pox, the course that is run by each is very similar ; they each produce a general fever at a certain period, and the pustules in each equally secrete the specific virus which alone can communicate the disease to others by subse-

quent inoculation. What is very remarkable, and unparalleled in the history of disease, is, that the cow-pox virus, after having passed through several persons, may be again communicated to the cow by direct inoculation in the nipples ; and this again will return to the state of casual cow-pox, in the milkers who handle the udder of the animal thus diseased, which abundantly proves that the nature of the infection continues the same under these varieties.* Hence we should expect that the security which the inoculated cow-pox affords against the contagion of the small-pox, (which constitutes its chief

* See Woodville's *Reports, &c. of Inoculations for the Cow-Pox*, page 62.

value) would be equal to that which the casual cow-pox infuses, and accordingly this is confirmed by the most authentic and unequivocal testimony.* From the comparatively recent date of the experiments made with the inoculated cow-pox, the authority of forty or fifty years (which the other form of the disease possesses in the dairy countries) is wanting. But as the very end of all these trials

* To quote particular authorities for this fact, would be to refer to almost every account which has been given of every inoculation made in different parts of the kingdom with vaccine matter ; as in fact they would be all quite futile without the *experimentum crucis* of resisting variolous contagion.

has been to prove the vaccine inoculation to be a complete preservative from the variolous contagion, and as they have been attended with entire success, there is no reason to suppose that any number of years will produce such an alteration in the constitution, as to renew the hazard of variolous contagion in any habit where it has been once completely extinguished. The uniform experience of inoculation for the small-pox, which may be recurred to by fair analogy, would contradict such a supposition. Like this latter disease, too, certain precautions are to be taken, and observations made, in order to distinguish the case of a spu-

rious and incomplete cow-pox, from that which is perfect and genuine.

The chief differences which exist between the casual and the inoculated cow-pox are in the degree in which each affects the body. As much of the severity of the disease depends on the extent of topical ulceration, the former, by producing larger and deeper pustules, generally occasions a much feverer disease; and these likewise are more liable to leave deep and extensive sores, long after the eruptive fever is subsided, which are difficult to heal. Another difference between the two forms of this disease is in the appearance of the pustules. Those which are formed

by immediate infection from the cow are more prominent, and have a blueish cast, which is very characteristic. This particularly happens in the casual disease, though it is also retained in the first inoculation from the cow,* but is undistinguishably lost after it has passed through one *generation* (if it may be so called) in the human subject.

THERE are several important circumstances belonging to vaccine inoculation, which deserve the atten-

* Woodville.

tion of the medical practitioner, and which require to be given in detail with that minute and circumstantial description which alone is able to give assistance in directing real practice. These will be conveniently arranged under a few distinct heads.

Of the Selection of Matter.

Dr. Jenner has laid down with great precision those sources of the spurious or imperfect cow-pox, that depend on the state and nature of the infecting matter employed for inoculation ; and subsequent observation has proved more than ever the necessity of attending to this part of the subject. They are ;

First. When the pustule that affords the matter is not the genuine specific cow-pox. This it is of great importance to be aware of, both when the disease is to be introduced immediately from the cow, and from the human subject. As we often find that almost any acrid matter from any kind of pustule, when applied by inoculation to a sound surface, will there excite inflammation and a pustule fore, a mistake as to the nature of the virus thus introduced might easily happen, and would lead to much error and false security with regard to variolous contagion. The distinguishing marks of the true disease in the cow, have been already

mentioned. Those which characterise the genuine disorder in the human subject, will be afterwards enumerated.

Secondly. When the matter is genuine, and would be perfectly unexceptionable if employed on the spot, but by being kept in a manner favorable to spontaneous alteration, or preserved in a careless way, it has lost its specific properties. This will apply to infecting virus procured either from the cow or the human pustule ; and from the frequent failure of matter to produce the disease, when it has been kept for a certain length of time, though with care, it seems to be probable that the vaccine virus is

more liable to lose its peculiar properties than the variolous, and requires greater precautions to be preserved in sufficient activity. This circumstance, however, (that is where good and proper matter has lost by keeping its power of giving the genuine infection) is much more commonly a source of total failure produce any effect from inoculation, than of exciting a spurious pustule, provided the matter had been taken at a proper period of the disorder, and in the most unexceptionable manner.

Thirdly. When the matter has been taken from a true cow-pox pustule, but has been furnished, not by the clear limpid fluid, which forms the

contents of the pustule in its earlier stages, but by the purulent matter which is to be found under the scab at that advanced stage of the disorder, when all the first fluid is dried up, and the pustule has either degenerated into a simple ulcer, or has lost its infecting properties. This particularly applies to the disease of the human subject ; but both in man and in cow, it is not very easy to fix the exact limits, when the local affection ceases to have any thing specific in its nature, and consequently to have the power of communicating the disease.

These three circumstances (in any of which a partial and therefore highly deceitful disease may be excited by spurious inoculation) will direct the practitioner in the choice of the matter which he employs.

The uniform mildness of the inoculated vaccine disease has hitherto afforded no grounds for any such distinction as good or bad, a healthy, or unhealthy sort of matter, which obtains (perhaps without foundation) in the small-pox ; and no perceptible difference of quality has been ascertained, between matter procured from the inoculated pustule as soon as it begins to afford any fluid, and that which is taken just at the time

when it is receding, and the scabbing process commences.

We may add, that hitherto no successive inoculations from one human subject to another have made any alteration, either in the nature of the disorder, or the appearance of the pustule after the first time of insertion from the animal ; when, as has been mentioned, it retains some of the character of the casual cow-pox. Therefore, as long as the supply of vaccine virus is kept up by propagating the genuine disease through successive inoculations, there will be no occasion to return to the cow for a new parent stock.

*Of the proper subjects and seasons for
Inoculation.*

THE vaccine disease, when properly introduced by inoculation, appears to have almost as great a superiority in point of mildness and security over the variolous inoculation, as this has over the natural small-pox : so that the same precautions which would be highly requisite in communicating the latter, (where the time can be chosen) become less so where the disorder is to be introduced by inoculation ; and still less where the vaccine is substituted for the variolous disease. The experience which the

inoculated cow-pox already affords, seems to show that it may be practised with great safety at any age, even from the earliest infancy.* In general, we may say that similar precautions are to be used here, as with variolous inoculation, so that even the vaccine disease should be avoided during the time of teething, or any particularly unfavorable state of body ; but we may assert with confidence that at any time it is preferable

Mr. H. Jenner inoculated with the cow-pox an infant a few hours old. The child went through the disease with the usual appearances in the pustle on the arm, but without any perceptible fever. It afterwards, however, resisted the small-pox completely.

to running any considerable risk of the small-pox contagion.

Of the method of performing the Inoculation.

THE object to be fulfilled in performing this operation is to secure the insertion of the infectious matter, with as little injury to the parts as is compatible with the end proposed. Uniform experience shows that in inoculating either with this or variolous matter, the method of making the incision is not a matter of indifference ; for, on the form and depth of the wound will in some measure depend the degree of violence in the

subsequent inflammation. In making the puncture in the arm, we cannot follow a better method than that recommended by Dr. Woodville,* who advises “ that the lancet should be held nearly at a right angle with the skin, in order that the infectious fluid may gravitate to the point of the instrument ; which in this direction should be made to scratch the cuticle repeatedly, until it reach the true skin, and become tinged with blood.”

The most certain method of securing the infection is to inoculate whilst the matter is fluid, and fresh

* *Observations on the Cow-Pox*, 1800.

from the pustule ; but as this is often impracticable, it is advisable to hold the infected lancet for some time over the steam of boiling water, to soften and dissolve the hardened matter. Where the virus has been procured upon thread, the same means are to be pursued as when inoculating with variolous matter ; that is, to make a small longitudinal incision upon the arm, to apply to it the infected thread, and detain it there by adhesive plaster, till the disease is communicated. This method is found to be more apt to fail than when the matter is received upon a lancet, provided it be fluid from the pustule ; but dried matter will seldom long preserve its efficacy, except

it be taken and kept with particular precautions. These will be mentioned in a subsequent section.

Progress of the Disease.

The progress of the vaccine inoculation, from the time of insertion to that of the drying up of the pustule, is commonly very uniform, the different stages of the local and general affection well marked, and the successive changes occur for the most part at regular periods. The following, therefore, may be considered as the history of this disorder which

will represent the most usual progress of the vaccine inoculation.

The first indication of the success of the operation, is a small inflamed spot at the part where the puncture has been made, which is very distinguishable about the third day; this continues to increase in size, becomes hard, and a small circular tumor is formed, rising a little above the level of the skin. About the sixth day, the centre of the tumor shews a discolored speck, owing to the formation of a small quantity of fluid, and this continues

to increase; and the pustule to fill, and become distended, till about the tenth day. At this time it shews in perfection the characteristic features which all along distinguish it from the variolous pustule. Its shape is circular, or sometimes a little oval, but the margin is always well defined, and never rough and jagged; the edges rise above the level of the skin, but the centre is depressed, and has not that plumpness which marks the small-pox pustule. As soon as the pustule contains any fluid, it may be opened for future inoculation, and about two days before and after the eighth day affords a period of four

days, when the matter is found to be in its greatest activity.

After the eighth day, when the pustule is fully formed, the effects on the constitution begin to shew themselves, the general indisposition is commonly preceded by pain at the pustule and in the armpit, followed by head-ach, some shivering, loss of appetite, pain in the limbs, and a feverish increase of pulse. These continue with more or less violence for one or two days, and always subside spontaneously without leaving any unpleasant consequence. During the general indisposition, the pustule in the arm, which had been

advancing to maturation in a regular uniform manner, becomes furrounded with a circular inflamed margin, about an inch or an inch and a half broad, and this blush is an indication that the whole system is affected ; for the general indisposition (if it occurs at all) always appears on, or before, the time when the efflorescence becomes visible. After this period, the fluid in the pustule gradually dries up, the surrounding blush becomes fainter, and in a day or two dies away imperceptibly ; so that it is seldom to be distinguished after the thirteenth day from inoculation. The pustule now no longer

increases in extent, but on its surface a hard thick scab of a brown or mahogany color is formed, which, if not pulled off, remains for nearly a fortnight, till it spontaneously falls, leaving the skin beneath perfectly sound and uninjured.

The above is the uniform progress of the disease in the greater number of cases, with only the variation of a day or two in the periods of the different changes. The successive alterations that appear in the local affection appear to be more constant, and more necessary to the success of the inoculation, than the general indisposition.

With regard to this latter, the degree is very various ; very young infants often pass through the whole disease without any perceptible illness ;* with children it is extremely moderate ; but with adults it is sometimes pretty severe for a few hours, though never in any degree dangerous.

AMONG the occasional circumstances and varieties which now and then occur, and which the practitioner should be aware of, though they do

* See note, p. 69.

not alter the nature of the disease itself, or render the patient at all less secure from receiving the advantages of the vaccine inoculation, are the following :

1. In a few instances a slight eruption or rash comes on around the inoculated part about the third day, which subsides spontaneously in a day or two without becoming pustular, and is entirely the effect of local irritation.

2. Sometimes, about the twelfth day, or after the general fever has ceased, the pustule, instead of showing a disposition to scab, remains considerably inflamed, the surrounding efflorescence increases in extent,

and the pustule, if not properly treated, is apt to degenerate into a small ulcer, which will continue long in a purulent state, and at last become difficult to heal. This, we have seen, is much more liable to follow the casual cow-pox, than the inoculated ; and in this state the matter which it secretes probably soon loses its specific power of communicating the cow-pox by inoculation.

3. A more important variety which has been observed sometimes to occur under particular circumstances, is the formation of complete pustules, both in the neighborhood of the inoculated part, and on other parts of the body. These pustules, run a

regular course, similar to that formed by inoculation, and become filled with a purulent fluid, which has likewise the specific property of communicating the disease by insertion.

The appearance of these pustules may certainly be considered as a rare occurrence in the genuine cow-pox, and this has given rise to some difference of opinion concerning their origin.

Among the probable causes of a truly pustular eruption, we may mention two which appear to be fully ascertained.

The first is a rough and unskilful method of inoculation, where the wound is made deeper than neces-

fary, and an insertion of the infecting matter takes place within the cellular membrane. In this case, several pustules will often appear on different parts of the arm, and (as in the small-pox) the local affection of the inoculated part will be more liable to severe inflammation.*

The second is the circumstance of

* A farmer inoculated several persons with vaccine virus on the point of an awl ; many of these had pustules which regularly filled with matter ; but other patients, inoculated from these pustules with a lancet in the usual way, had no eruption, but went through the vaccine disease in the mildest and most regular manner. See in the *Medical Journal*, No. 14, a letter from Mr. Grose of Winslow.

the patient being exposed to the contagion of small-pox, during the time that the vaccine inoculation is making its usual progress. The large proportion of pustular eruptions, and the greater severity of the disease, that occurred during the first experiments on the vaccine inoculation at the Small-Pox Hospital near London, are to be accounted for on this ground.*

It is an important circumstance that the cause of these latter pustular cases is now fully cleared up. The vaccine inoculation, *in its earlier stages*, is not able to secure the patient against the contagion of the

* Woodville's *Observations on the Cow-Pox.*

small-pox. In this it differs very essentially from the variolous inoculation ; which last, it is well known, will supersede the effects of the contagion of natural small-pox, even after the body has been exposed to it for four or five days. Therefore, when a person inoculated with cow-pox matter falls in the way of small-pox contagion during the first four or five days from inoculation, each disease will make their progress in some degree separately. The inoculation will produce its proper effect on the arm, whilst the small-pox contagion will occasion the pustules in other parts of the body. The matter, however, taken from the inocu-

lated vaccine pustule has no disposition to produce pustular cases, and therefore under any other circumstances there is no reason to apprehend a mixture of variolous infection. It may likewise be remarked, that when the two diseases mix in the manner above-mentioned, the vaccine pustule is not in general surrounded with the usual efflorescence.

Sometimes, in one or two rare cases, pustules will be formed without any assignable cause : this has happened in the inoculation of a considerable number of persons, by far the greater part of whom have not

had any appearance of this symptom.*

The pustules do not always come to maturity, but often dry up and disappear before they contain any notable quantity of fluid. When they do advance to suppuration, they bear a perfect resemblance to the distinct pustules which are formed in the small-pox in its most favorable state.

* In the Rev. Mr. Holt's inoculation, (*Medical Journal*, No. 10) three cases out of three hundred proved to be pustular: but in a subsequent inoculation of eight children with the matter taken from these pustules, no such appearance was produced, but the disease assumed the mildest form. See also note, p. 69, and Dr. Woodville's *Observations*.

Medical Treatment.

It is a particular recommendation of this disease, that, though much attention and discrimination be necessary in selecting the matter for inoculation, and performing this slight operation in such a manner as to insure success, and (as we shall presently mention) in ascertaining, in some doubtful cases, whether or not the infection has fully taken, very little medical care is necessary in order to conduct the patient through it with perfect safety. Much of the hazard incurred in the small-pox is owing to a larger eruption upon the skin than the constitution can support ; and the degree of risk to life is

in a great measure proportioned to the quantity of eruption : whereas, in the cow-pox, this symptom may for the most part be avoided, by guarding against some of the causes which produce it, and is seldom so severe as to give any ground for alarm.

The inoculated vaccine disease, with infants and children, is uniformly mild during the whole course from the first insertion to the scabbing process ; and even in most cases is attended with so little fever as scarcely to be detected even by an attentive eye, and requires no medical treatment. Indeed, as the great object is to produce the disease in a form so perfect as to leave no doubt

about its appearance, and absolutely to secure the patient from any subsequent contagion of small-pox, it seems hardly advisable to take any measures to check the approach of fever about the eighth day, any otherwise than by preserving strictly that state of temperance which well regulated children are generally kept to during the earlier part of life. Therefore, the preparing medicines which usually make a part of the remedial process during inoculation with the small-pox, are scarcely requisite here, especially when children are the patients; except in those habits that suffer considerably at all times from any febrile attack. When the symptoms of fever

are manifest, and threaten to become at all severe, a brisk purgative, such as a dose of salts, generally produces very speedy relief. This is particularly useful when the patients are adults.

In the small-pox, after the eruptive fever has subsided, the pustule formed by inoculation is apt to degenerate into a tedious sore, and even abscesses form in the arm, which, in infants, have sometimes been followed by the most serious consequences. The same cause of complaint exists in the inoculated cow-pox, but the inflammation may generally be checked without difficulty, before it proceeds to any great height.

When the efflorescence comes on around the pustule about the tenth day, and the fever has subsided, we may consider the constitution as having done with the disease for every purpose of future security ; and therefore the local affection of the arm may be put an end to, as soon as it can be done conveniently. In by far the greater number of cases, the scabbing or cicatrization succeeds the pustular process with perfect regularity. Where this happens, no application of any kind to the parts should be employed ; but, when the inflammation increases, when the inoculated pustule becomes pain-

ful, and the arm stiff, the mischief that is then threatened, may, if neglected, give more trouble and indisposition than all the preceding part of the disease.

To prevent this, several local applications to the pustule may be employed, all of which for the most part check the inflammation very readily, and induce the healing process.

Mercurial applications, from analogy with their known good effects in the local ulcers of the small-pox, have been tried, and with great success. The part affected should be daily dressed with common mercurial ointment, or, what is a more active preparation, the Red Precipitate

of Mercury, (*Hydrargyrus Nitratuſ Ruber*) in the form of an ointment. In two or three days after uſing this remedy the ſore generally puts on a better appearance, and becomes diſpoſed to heal, after which a ſimple dreſſing may be employed.

In many caſes, however, nothing more is neceſſary to check the threatening inflammation, than to keep the part conſtantly moiſtened with vinegar and water, or Goulard's extract and water, till the puſtule is dried up, and only a hard ſcab left.

In order to put a ſpeedy period to the local diſorder when no longer neceſſary, it has been recommended, by Dr. Jenner and others, to apply

for a very short time some very active and corrosive solution, which may hasten the process of cicatrization, and prevent any trouble that might arise from fresh ulceration at the pustule. A drop of strong vitriolic acid taken upon the head of a probe and thus applied to the pustule for a few seconds, and afterwards washed off; or the undiluted Goulard's extract (*Aq. Lithargyri Acetati*) will answer this purpose, and shorten the cure of the local disorder. It is to be observed, however, that it is only very rarely, and in unusual inflammation protracted beyond the eighth or tenth day, that we should employ any of these remedies: and we should also

be aware that, as they will any time induce a premature scabbing, they would in all probability, if used too early, entirely extinguish the disease before it had rendered the constitution secure against the variolous contagion, and thereby the end of the vaccine inoculation would be defeated.

*Method of taking and preserving Matter
for future Inoculation.*

There are few practitioners of the vaccine inoculation, who have not experienced repeated disappointments in attempting to introduce this infection, from the circumstance of the,

virus losing its efficacy in a very short time after having been taken from the pustule. This certainly depends in many instances on a want of activity in the matter itself, for frequent failures have happened, even where every possible precaution has been observed, and where no great distance of time has occurred between the time of taking the matter and the attempt to inoculate the disease. And yet it has also happened, that the inoculation has succeeded, with matter preserved with no unusual care, and even after having been carried across the Atlantic. A few observations may therefore be made with regard to the method of taking and

preserving the infecting matter. Where the virus is to be used directly after being taken from the pustule, nothing is so convenient for receiving it as the lancet with which the subsequent inoculation is to be performed; and it has frequently happened that this method of inoculating has succeeded, both with variolous and vaccinc matter, after repeated failures from every other method. As, however, this mode cannot always be conveniently used, the matter must be allowed to dry on the substance on which it is received, and afterwards diluted with water, that it may be sufficiently liquid for insertion. A lancet will very commonly answer the purpose

in this case also, if used within a very few days after the matter has been taken ; but it seems to be well established, by repeated observation, that this method is very precarious for conveying infection to any considerable distance, or for some length of time before it is to be used. It becomes then much safer, either to moisten a piece of cotton thread in the matter fresh from the pustule, or to receive it upon a small plate of glass, over which, when the matter is dry, another piece of equal size should be laid. In all cases the liquid virus should be suffered to dry gradually and thoroughly in a warm temperature, and then should be

secured from the access of air by cementing together with sealing-wax, or some similar substance, the plates of glass, or by well closing the phial into which the thread is put. Previous to inoculating from the glass plate, the matter must first be diluted with a very minute drop of warm water, well mixed by the point of a lancet, which last should then be made to take up as much as will be necessary for inoculation, and held with the point downwards, till the fluid which is upon it has acquired rather a thicker consistence. After which, the puncture may be made in the manner already mentioned. It may be observed, that though we

should avoid doing such violence to the pustule which furnishes the matter, as to make it bleed, yet the virus itself does not seem to lose any of its infecting power, by being accidentally mixed with a drop of blood.*

* As the circumstance of the vaccine virus becoming very hard and not easily again soluble when once dry, has been considered by some, as a principal cause of the frequent failure in this inoculation; an ingenious friend of mine has suggested, and in one instance attempted, a method of preserving the matter in its fluid state, by receiving it in a very minute hole, not bigger than a pin's head, drilled in glass, and carefully cementing the hole again, to prevent the inclosed matter from drying by

There is only one way of transmitting this infection from one country to another, which is still more secure than either of the above, and this is, to keep up a constant succession of pustules by inoculation of different persons (on board of ship for instance) which may be done at all times without the least risk of any general infection, and with very slight trouble and inconvenience to the persons so inoculated. As a perfect pustule may commonly be formed, by inoculating persons who have already had

evaporation. From some imperfection in this minute apparatus, the first experiment failed, but the idea merits attention.

the small-pox, though they are unfusceptible of any general vaccine disorder, the series of infection may be kept up, though proper subjects for the disease be wanting.

To conclude the comparifon between the variolous and the vaccine difeafe, we may obferve that there are two points in which they differ very fenfibly ; in the form, and contents of the puftule. That which is formed by vaccine virus, in by far the greater number of inftances, continues perfectly circular during its whole progrefs ; at all times the

edges are elevated, and the surface flat, and it does not shew that prominence in the centre which arises from being quite distended with its contained fluid. The small-pox pustule at the place of insertion, while advancing to maturation, generally becomes jagged at its edges, and the outline is rendered irregular by clusters of small pustules. These, in the end, often become confluent, and leave a sore of a much greater extent than that of any single pustule, the subsequent progress of which, as has been mentioned, is frequently the cause of much trouble, and sometimes of danger, to infants.

The inoculated cow-pox pustule,

on the contrary, continues well defined through every stage ; and this perhaps is the reason why it much less frequently leaves any open sore at the time when the scabbing process should come on.

The contents of the respective pustules also differ. The fluid which the vaccine pustule secretes does not progressively change from a watery to a thick purulent matter, as in the small-pox, but continues thin and almost limpid, till it entirely disappears. It is also succeeded by a hard brown shining scab, which latter is harder, smoother, and of a darker color than that which attends the variolous pustule.

Where the vaccine inoculation is followed by no local disorder, or only a slight redness at the punctured part for a day or two, we can have no doubt that the operation has failed ; but cases sometimes happen where the failure is equally certain, but which require much more discrimination to be distinguished from those in which the disorder is complete and genuine.

The regularity with which the local disease at the place of inoculation runs through its several stages, seems to be the principal point to be attended to ; for the accession of fever is certainly not necessary to constitute the disease, since the greater

number of infants have no apparent indisposition. Therefore, when the pustule advances in a very hasty and irregular progress,* when the inoculated puncture on the second or third day after insertion swells considerably, and is surrounded with an extensive redness, this premature inflammation very certainly indicates a failure in the operation. Even when the inoculation has advanced for the first few days in a regular manner, but when, about the sixth day, instead of exhibiting a well formed pustule and vesicle of fluid,

* See the excellent practical observations in the latter part of Dr. Woodville's *Observations on the Cow-Pox.*

the part runs into an irregular festering sore, the purpose of inoculation is equally defeated ; and these varieties require to be watched with an attentive and experienced eye, since they might readily lead to a false, and perhaps fatal idea of security against any subsequent exposure to a variolous contagion.

CHAPTER III.

*GENERAL OBSERVATIONS CONCERNING
THE VACCINE INOCULATION.*

A QUESTION of considerable importance has been suggested, arising directly from a review of the foregoing subject : namely, whether the cow-pox is not originally the parent disease to the small-pox, whilst the observed differences only depend on the length of time in which the latter disorder has passed through various constitutions in the human race.

The great similitude in the operation of each infection, and especially the change that the one makes upon the human constitution in rendering it either partially or intirely insensible to the power of the other, (a fact without example in the history of physic,) would imply at least a very intimate resemblance in the nature of each. If this question were answered in the affirmative, the immediate inference would be, that, by conveying the vaccine disease into the human constitution, it would in a series of years, through imperceptible gradations, at length assume the variolous nature. Hence it would happen, that the inoculated cow-pox

would gradually become a more severe disorder, and would at the same time be communicable by contagion, and no longer be the mild and safe disease that we now find it. Experience, however, as far as it has hitherto been carried, does not show any approach to this state: the vaccine inoculation continues to promise as many and great advantages as it at first held out; the pustular cases (which are the most severe) are not more frequent than formerly, but on the contrary, we are now generally able to avoid them, by removing the causes from which they originate.*

* In the last 1500 inoculations at the Small-Pox Hospital (where pustular cases are most

We may therefore safely continue the vaccine inoculation, without any probable prospect of finding at last that we have only been introducing the variolous infection under a different form ; but, even should this happen, there can be no risk as to the security from subsequent contagion of the small-pox (the ultimate end of inoculation,) since it cannot be supposed that this security, which even at present is complete, should be at all *diminished* when the inserted disease approaches to a variolous nature. The possibility of such an event, how-

to be expected) these cases have been even less than three or four in the hundred, according to Dr. Woodville's report.

ever, should be an inducement to attend accurately to the disease in the cow, that, if necessary, we may at any time resume the original infection from the fountain head.

It has been often remarked, and is confirmed by constant experience, that the small-pox, long after all its immediate effects have disappeared, is apt to leave the constitution peculiarly liable to suffer from scrophula, where a tendency to this disease existed in the body before the introduction of the small-pox. Therefore, although variolous inoculation will not convey the seeds of scrophula along with its own infection into a sound habit of body, it may be the

cause of considerable trouble during the early part of life, in certain instances. The cow-pox has not been found to resemble the small-pox in this respect ; whether from its great mildness, or from some more obscure cause depending on a peculiarity of its nature, we are not able to determine : but, if the daily accumulating observations that are making on this disease continue to confirm this important circumstance, it will be an additional reason for its adoption in preference to the small-pox.

It is a peculiar advantage belonging to the vaccine inoculation, that in any stage of this disorder the risk of endangering life is so small as scarcely

to be estimated in any certain proportion. In the natural small-pox, the number of fatal cases is very considerable,* and even in the inoculated disease, a certain portion, varying according to the season of the year,

* In the London Bills of Mortality (which by no means include all that die in the metropolis) the number that annually perish by the small-pox is, on an average, upwards of two thousand ; so that this disease generally stands the third or fourth in the order of fatality. For further particulars on this subject, the reader will find some interesting matter collected from different authorities in a paper in the Medical Journal, No. 21, by Dr. Cappe of York, whom I am happy to call my friend, and whose active and judicious inquiries into this subject, have highly contributed to present it to public notice in the city where he resides.

and the mild or malignant nature of the infection, fall a sacrifice to this distemper. In common inoculation, this proportion is very small ; so small indeed, as, where it occurs, to be generally an unlooked-for event, at least with the friends of the sufferer. Still, however, the risk to life may be estimated, and will always be felt in the 'anxiety of the parent. With the cow-pox the hazard is not appreciable. One solitary instance of a fatal event* makes a very small ratio

* In the former edition of this treatise, this sentence alluded to a fatal case which happened at the Small-Pox Hospital. Later inquiries,

with the successful cases already on record ; and the daily accumulation of these latter, renders the disproportion so small as almost intirely to extinguish every idea of danger.

and especially the discovery now made, that the vaccine infection will not preserve from small-pox contagion in the earlier period of vaccine inoculation, render it scarcely questionable, that the death which here unfortunately occurred, should really be contributed to a very active contagion of small-pox. The child died before any eruption could appear, but with the same symptoms as occur in other instances of fatal convulsions, previous to the time of variolous eruption. Another fatal case occurring after inoculation with vaccine matter, which has lately taken place near this metropolis, has served to show the great importance of attending to the directions to be followed in fe-

This circumstance, it may be presumed, may have a very important operation on the minds of those who have long uniformly and consistently opposed on religious grounds the introduction of the inoculation of the small-pox. To these, this widely diffused practice has only been the source of mischief, by extending this contagious distemper on every side and in every corner of the kingdom; and, being withheld from enjoying the immediate benefit which it offers,

lecting matter for inoculation; and when entirely explained, we may expect with confidence, that this will enable every medical practitioner to avoid a similar unfortunate event.

they have not reaped an adequate recompense from the more indirect advantage of a better knowledge which inoculation has led to in the general treatment of the disease.

To those, therefore, who hesitate to endanger human life by a voluntary disease, however small the risk, and however great the promised advantage the vaccine disease will stand in peculiar estimation, as it offers all the benefit which the variolous inoculation is known to insure, and removes to an extreme distance every hazard of a fatal event.

One more observation may be added, which is, that as the cow-pox inoculation has not the advantage of anticipating the contagion of the natural small-pox, there are some cases in which the variolous inoculation is preferable. If a person, who has never had the small-pox, be accidentally exposed to its contagion, it has been always reckoned the surest method of diminishing the risk thereby incurred, to inoculate immediately, and thus to convert (as it were) the natural into the inoculated small-pox ; or rather to extinguish the former, by introducing the latter into the constitution, in a much more direct and speedy manner. In these

instances, and perhaps only these, inoculation with the small-pox is still to be retained, for it is now fully established, that under such circumstances, the cow-pox cannot be trusted to.

If future experience shall continue to confirm the important advantages which the cow-pox now offers to the human race, and if the establishment of this inoculation, so happily introduced to the world by Dr. Jenner's able investigation, shall continue to advance with the rapid progress that has hitherto attended its steps, it will soon become an object of sufficient magnitude for universal attention, in

every part of the world that is constantly experiencing the ravages of the small-pox ; and the extirpation of this formidable malady from every civilized country will no longer be a very impracticable undertaking.

That the vaccine inoculation is peculiarly calculated to bring about this most desirable end, appears from a review of its leading features. Were even the advantages which it offers much less perfect than we find them to be, were it only to secure from variolous contagion the greater part of those inoculated with it, or only to exercise its preservative powers for a certain number of years,

the mere circumstance of not being itself communicable by contagion might still render it worthy of notice in any general and national plan for extirpating the small-pox, though it would then no longer recommend itself to individuals.

But, since it possesses all the security of the infected person which the inoculated small-pox affords, it may be an additional motive of preference with many, that, whilst the welfare of the individual is eminently consulted by employing the vaccine infection, no contagion is spread abroad of a disease, which, when acquired by contagion, is one of the most distress-

ing in its symptoms, formidable in its appearance, and doubtful in event, of any to which the greater part of mankind are exposed.



THE following collection of written testimonials, will at once show the degree of credit which the Kine-Pox disease has gained and the progress of the inoculation, since the first publication upon the subject, by Dr. Edward Jenner, in June 1798 ; and therefore it may be of use to annex it to the foregoing work.

Dr. JOHN RING, London, July 6, 1799.

“ THE success of the practice has, on the whole, been such as to gratify every reasonable expectation ; especially if allowance be made for the error of taking the matter from an improper pustule ; an error easy to be avoided in future.” Again, “ I am happy in being able to add my testimony to that of Drs. Jenner, Pearson and Woodville, in confirmation of the efficacy of the new practice.”

Dr. WARD, of Manchester, July 12, 1799.

“ May I not indulge a hope that the era is probably not far distant, when we shall be able to congratulate mankind at large on their having a fair prospect of being exempted, at no very remote period, from that most destructive malady”—Small-Pox.

London, July 19, 1799.

“ Many unfounded reports having been circulated, which have a tendency to prejudice the mind of the public against the inoculation

of the cow-pox, we, the undersigned physicians and surgeons, think it our duty to declare our opinion, that those persons who have had the cow-pox are perfectly secure from the infection of the small-pox. We also declare, the inoculated cow-pox is a much milder and safer disease than the inoculated small-pox."

" *William Saunders, M. D. Matthew Baillie, M. D. Henry Vaughan, M. D. Maxwell Gartshore, M. D. J. C. Lettsome, M. D. James Sims, M. D. John Sims, M. D. William Lister, M. D. Robert Willan, M. D. Thomas Bradley, M. D. Thomas Denman, M. D. John Squire, M. D. Richard Croft, M. D. R. J. Thorton, M. D. John Abernethy, William Blair, S. Chilver, Henry Cline, Astley Cooper, Edward Ford, J. M. Good, James Horsford, Joseph Hurlock, Francis Knight, James Leighton, James Moore, Thomas Paytherus, Thomas Pole, J. W. Phipps, John Ring, James Simpson, H. L. Thomas, Jonathan Wathen, Thomas Whately.*

Dr. THORTON, London, August 4, 1799.

" The cow-pox is an era in the annals of medicine, and must redound eternally to the honor of Dr. Jenner, who was sent to detect and generally apply this noble discovery.

September, 1799.

Dr. KELSON of *Severn Oaks*, Dr. MITCHILL of *Chatham*, Dr. HARRISON of *Horncastle*, had each inoculated nearly 100 patients, and afterwards with matter of Small-Pox ; but none took the disease.

September, 1799.

Dr. PEARSON made a communication to the public, of the progress of the *new inoculation* ; at which time nearly two thousand had been inoculated in England. His paper concludes with the following intelligence :

“ The sensation excited on the Continent by the vaccine inoculation, has been much more considerable than even in our own island, as I learned, first from Dr. *Marcet*, and since, by a letter from Dr. *Peschier*. At Vienna, Dr. *Farro* inoculated two of his own children with vaccine matter, which I transmitted ; and next Dr. *De Carro* inoculated two of his own children. An accurate journal of these two last cases was kept by Dr. *De Carro*, which he has had the complaisance to communicate to me through the hands of Dr. *Peschier*. The above patients had the vaccine disease in the usual mild way that they have had in England, and were inoculated subsequently for the small-pox, but without taking the disease.”

“ It is expected that Dr. *Frank* will adopt the new inoculation, as it is likely to be generally done at Vienna.”

“ I expect reports from Portugal, and other parts of the continent.”

“ In Scotland the new inoculation has not been less successful. Dr. *Anderson*, of Leith, informs me he has inoculated above eighty persons ; that Dr. *Duncan*, and others, have begun the practice at Edinburgh ; and that it has been introduced in Dundee, Paisley, and Dalkeith.”

“ If the vaccine inoculation proceeds with equal mildness as it has done the last four months, doubtless the variolous incision must, in no remote period, be suspended. And if such an event should take place, posterity will behold with amazement, the prejudices and inattention of their predecessors to the application of a fact in practice, by which a formidable and loathsome disease was extinguished—a fact well known, time immemorial, to almost every farmer in half a dozen counties of England, but neglected till *Jenner* had the courage to indicate the advantage of it to society.”

September 11, 1799.

Dr. *EVANS* of Ketley, in Shropshire, says,
“ In consequence of the experiments I have

made, and the confidence I have in the “reports” of the extensive experience of my ingenious friend, Dr. *Woodville*, on the subject, I am decidedly of opinion, that the cow-pox is a certain preventative against the small-pox.”

At this time he had inoculated above sixty persons for the cow-pox, and a considerable portion of these subsequently for the small-pox.

December 2, 1799.

The institution for the inoculation of the vaccine-pox, was founded, at which time it is stated in the official address to the public, that “above 6000 persons had had the inoculated cow-pox disease. Not a single well attested instance has been produced, among more than 2000 of the above persons, known to have had the inoculated vaccine-pox, and who were subsequently inoculated for the small-pox, of this disease being subsequently taken, although many of them were also exposed to the infectious effluvia of the natural small-pox. And, traditionally, this fact has been established, time immemorial, with regard to the casual cow-pox.”

Dr. A. HUGGAN, Plymouth, December 31, 1799.

“The introduction of the cow-pox into practice, as a substitute for the small-pox, having been found to be expedient, in the most exten-

five sense of the word, the discussion of the subject will, of course, be considered as closed. This is a circumstance truly honorable to Dr. Jenner, by whom this beneficial improvement, doubtless one of the most important in Medicine, has been first made known to the world."

* * * "As I am perfectly satisfied from the proof already before the public, of a person who has had the vaccine, being thereby rendered unsusceptible of variolous infection, I have not thought it necessary to inoculate any of my patients with the poison of the latter disease, having seen several of Mr. Stewart's, on whom the experiment was made, and with it, almost needless to add, the usual effect."

Dr. RICHARD DUNNING.

"From the mass of evidence already before the medical world, and from what has fallen under my own observation, I am intirely disposed to give credit to the present advantages said to be derived from the new inoculation ; and to those much greater consequences which promise to result from it to posterity. I experienced the greatest satisfaction on finding a man of Dr. Denman's great and justly acquired celebrity expressing himself so dispassionately on the important subject of cow-pox. His letter will undoubtedly give a weighty support to the interest of the vaccine inoculation."

*From a communication by Dr. THOMAS DENMAN,
London, March, 1800.*

“ Entertaining no doubt of the advantages which will result to society, when Dr. *Jenner's* proposal for inoculating with the cow-pox shall be generally adopted, I have thought that some good might be produced by an attempt to remove prejudices ; for it appears to me, that none of the facts or observations mentioned by Dr. *Jenner* have been disproved or refuted,” &c. &c.

J. H. GROSE of Winslow, March 15, 1800.

“ A more valuable discovery cannot be made for the public than this, as it may be the means under providence, if not of banishing, at least diminishing, the fatal influence of a disorder which has so long desolated mankind ; and I am happy to add that the practice is daily extending.

Dr. T. TROTTER, May 6, 1800.

“ The JENNERIAN inoculation has been introduced into this neighborhood by Dr. *Huggan*, and earnestly supported by all the scientific part of the medical profession. Like the early propagation of Christianity, by its divine leader, it was first “ preached to the poor.” The children of poor soldiers and poor fishermen, first partook of its blessings : publicans and sinners have since embraced it ; and the purity of its

doctrine and practice is making proselytes to the very land's end in Cornwall."

*Dr. MARSHALL of Eastington, Gloucestershire,
to Dr. JENNER.*

" Dear Sir,

" Since the date of my former letter, (Apr^l 26, 1799) I have continued to inoculate with the cow-pox virus. Including the cases before enumerated, the number now amounts to four hundred and twenty three." " I have already subjected two hundred and eleven of my patients to the action of variolous matter, *but every one resisted it.*" " The result of my experiments (which were made with every requisite caution) has fully convinced me that the *true cow-pox* is a safe and infallible preventative from the small-pox ;" and, " if the many important advantages which must result from the new practice are duly considered, we may reasonably infer that public benefit, the sure test of the real merit of discoveries, will render it generally extensive."

Dr. KELSON, Severn Oaks, May 19, 1800.

" The facts I can state to be clearly demonstrated by my extensive inoculation, (between 3 and 400 patients) are these : That the disease is a *thousand times* more trifling than small-pox, scarcely having had a patient sufficiently

ill to prevent amusement or labor :—That it is not an *infectious disease* ; to determine which, I selected about 40 people in our work-house, and inoculated half of them, some in both arms, and fixed them to sleep with those who had not had it ; but in no instance was it communicated to the others. I broke the pustules, and frequently made them smell the parts, but to no effect. After giving the disease to the remainder, I, beyond cavil, ascertained it to be a *perfect security against the small-pox*, for I immediately inoculated the whole party with the most virulent variolous matter I could procure ; but nothing ensued, except local superficial inflammation for the first six or seven days. I then introduced a wretched family, just recovered from very bad small-pox, their dirty clothes unchanged, and divided them in different beds among them, but to no purpose. I then inoculated with cow-pox an infant, and as soon as I was satisfied it had taken, I put it, and kept it in the bed with its sister who had the most dreadful confluent small-pox, but no inconvenience ensued. Most of the work-house children, I have this spring inoculated again, both with variolous and vaccine matter, but nothing happens : this shews the vaccine effect to be a *lasting security against itself*, as well as the *small-pox*. Besides the cases above noticed,

most of the others whom I have inoculated, have had variolous matter inserted afterwards, for the satisfaction of themselves or friends."

*To Dr. BRADLEY, from Dr. CHARLES COOKE,
Glocester, May 29, 1800.*

"If I had waited for the present increasing numbers of impartial testimonies and indubitable facts in favor of vaccine inoculation, I need not have troubled you to insert this letter in your useful publication ; but as, in the outset, I did (with more zeal than prudence) oppose, what I then considered an innovation in practice, (by confounding the uncertain effects of the advantages evidently arising from this disease when inoculated) I now think it right, in justice to Dr. Jenner and the medical public, to declare, that, in the course of my practice, I had occasion to make trial, and do approve of vaccine inoculation ; yet, I think it should be conducted by practitioners, who have taken proper care to ascertain the genuine disease."

Dr. ANDREW DUNCAN, Professor of the Institutes of Medicine in the University of Edinburgh, in a letter to Dr. MILLER of New-York, dated October 2, 1800.

States, that "vaccine inoculation is making great progress at Edinburgh, and promises fair to render the small-pox much milder than vari-

olous inoculation. The medical practitioners here have given the lead ; the children of Dr. Gregory, Dr. Spens, Mr. Bennet, &c. having been inoculated with vaccine matter. Though many hundreds have now been inoculated at Edinburgh with vaccine matter, yet, among all these, not one case has occurred where the patient was ever in the smallest danger, or had a symptom in any degree alarming. Not one instance has occurred, where the child, after vaccine inoculation, has taken the small-pox ; though repeatedly inoculated with variolous matter, and intentionally exposed to natural contagion.”

[*Medical Repository.*]

From Dr. LETTSOM of London, to Dr. BARTON of Philadelphia.

“ Vaccine inoculation is becoming more and more general in England ; and on the European continent about 16,000 have had the disease, if disease it can be termed, without any case of fatality ; and about 3000 have been inoculated again with the common small-pox without conveying any disease ; so that, probably, soon, no other than the cow-pox will be adopted here. I imagine a fatal case will never occur, as there is rarely more than one pustule.”

Dr. ROBERT CAPPE, York, September 6, 1800.

" Dr. Woodville had, several months ago, inoculated 1000 people with the small-pox, who had previously had the inoculated cow-pox; not one of them received the infection. Many elderly people, who had received the cow-pox casually, were inoculated for the small-pox after many years, one at the distance of 53 years, but did not receive the infection. From Dr. Jenner's first pamphlet, and a letter lately published, addressed to him by William Fermor, Esq. I have made the following list of persons, who had had the cow-pox many years before and did not receive the small-pox on inoculation. Many were often exposed to them in their own families when epidemic."

" *Interval of years between the infection of cow-pox, and inoculation of small-pox.*"

" From Dr. JENNER.		" From Mr. FERMOR.	
" Joseph Merret,	25	" William Tredwell,	3
" Sarah Portlock,	27	" Albin Collinbridge,	4
" John Philips,	53	" Mr. Stephens,	4
" Mary Barge,	31	" Thomas Stales,	6
" Elizabeth Wynne,	38	" Mr. Collinbridge,	10
" Wm. Struchcomb,	10		
" Hester Walkley,	26		

" We have reason to be infinitely thankful to providence for the means now put into our power,

of immediately checking the ravages of one of the most fatal plagues ;* and for the cheering hope of intirely exterminating the scourge from the face of the earth. With these sentiments I feel it not less than a duty to lend my aid in spreading around the knowledge of the advantages which the vaccine inoculation offers."

[*Address to the Inhabitants.*]

N. B. The above extracts are principally from communications in the Medical Physical Jour-

* More than 2,000 persons in the city of London die annually of the small-pox ; but the malignity of the disease is incalculable, whenever it becomes epidemic, as it sometimes does, owing to some peculiar temperature of the season and climate affecting the human constitution with an influence of such kind and degree as to favor its casual spread : then, indeed, its ravages become truly alarming, and, under these circumstances, it often assumes all the destructive qualities of the most deadly plague ; at such time even inoculation will not materially lessen the mortality, as appears from the following :

" We learn from Halifax (Nova-Scotia) that a general inoculation for the small-pox has been lately admitted there ; (last autumn, 1800) and that the mortality has been very considerable, particularly among children. One letter mentions 800 deaths, infants and adults, and that one family had lost seven persons."

[*National Intelligencer.*]

nal, published monthly in London: a work popular and extensively circulated upon the continent of Europe and in America.

Thus spontaneous, respectable and unequivocal are the testimonials which have from time to time appeared before the European public, favoring the Jennerian doctrine; and so forcible and abundant are the evidences in confirmation of the most favorable reports of the kine-pox inoculation as has seemingly precluded doubt and bid defiance to skepticism: even prejudice stands abashed, and determined opposition has softened into, what is termed, prudential caution. What more can be done or said than has been, to produce a general conviction of the utility of the kine-pox inoculation; in that it *is a perfect security against any after infection from the small-pox?* and when once this fact is acceded to as indisputable, what reasonable being will hesitate a moment in giving it the preference to the inoculated small-pox as a security against a casual infection? Its comparative advantages are certainly very great and striking: [From Dr. Henry Jenner's address to the public,]

SMALL-POX,

Very frequently calls latent diseases into action ; in these are included the various species of scrofula.

Is contagious and communicable by effluvia.

Cannot be communicated with safety to children when cutting teeth.

In sickening with the small-pox, children are *frequently* afflicted with alarming fits ; and when their constitutions are delicate, they suffer materially in their health during life.

Is often fatal.

Is attended with eruptions and very often disfigures the countenance.

Cow-Pox,

We may safely conclude, from a long and careful observation of this disease, as communicated from the Cow, and from no limited experience in its inoculation, that it excites no disposition to other complaints.

Numerous experiments testify, that this never happens in the cow-pox.

This circumstance forms no objection to inoculate with vaccine matter—numerous experiments justify the assertion.

Nothing of this kind has ever appeared in this disease ; and the constitutions of children have been improved by its communication.

No instance of the kind has ever happened.

In this disease (even in the natural way) I never observed any pustules.

Persons afflicted with this disease cannot mingle with those, who have never been afflicted by it.

This objection does not apply to the cow-pox, as it is neither contagious, nor communicable by effluvia.

Medicines are necessary to be administered.

Here no medicines are required.

Notwithstanding the present improved state of inoculation, parents and friends must feel a considerable degree of anxiety for the safety of relatives, &c.

Little anxiety can be felt in this disease, as it is never attended with the least danger.

Requires a Nurse.

This disease does not.

“ The above comparison of the advantages which are to be derived from the substitution of the vaccine disease for the small-pox, is founded upon principles which experience has proved to be fixed upon the solid basis of truth. I am certainly entitled to speak with confidence on the subject ; as, in conjunction with my uncle Dr. *Jenner* (who with indefatigable industry, has completely investigated the nature of cow-pox) I have had a very extensive acquaintance in this part of medical practice,” &c.

“ Since my former publications on the vaccine inoculations, (says Dr. *Jenner* in his third

treatise upon this subject) I have had the satisfaction of seeing it extended very widely. Not only in this country is the subject pursued with ardor, but from my correspondence with many respectable medical gentlemen on the continent (among whom are Dr. *De Carro* of Vienna, and Dr. *Ballhorn* of Hanover) I find it is as warmly adopted abroad, where it has afforded the greatest satisfaction. I have the pleasure too of seeing the feeble efforts of a few individuals to depreciate the new practice, are sinking fast into contempt beneath the immense mass of evidence which has risen up in support of it."

"Upwards of 6,000 persons have now been inoculated with the virus of cow-pox, and the far greater part of them have since been inoculated with that of small-pox and exposed to its infection in every rational way that could be devised, without effect."

The kine-pox inoculation, ere this, no doubt, would have been sanctioned by the united testimony of American Physicians could they have had the privilege and means of collecting such data from their own experiments as should be thought necessary for an accurate and just decision upon so important a subject. In other countries and with communities in general, the small-pox has become a domesticated disease

propagated and continued by successive inoculations, at the pleasure and consent of parties ; while here, in New-England, private inoculation for the small-pox is recognised as a crime to which a severe penalty is annexed ; a circumstance operating as a complete barr to any thorough investigation of the nature of the disease in question, and thus subjecting gentlemen of the faculty to the necessity of remaining either in a state of suspended judgment, or of founding their belief upon the testimony and experience of others : and it so happens that there are some if not many of the faculty who are unwilling to come to any positive decision in a case like the present, until from their own experiments they shall have ascertained those facts, and possessed themselves of such evidence, as guided the decision of others.

On an occasion like the present it is truly unfortunate that there should be any unnecessary obstructions in the high road to improvement ; investigation should be free and unembarrassed, nay, encouraged by every legitimate aid. Ought not the authority of law, if found to oppose, to be softened into kind indulgence ? and is it unreasonable to expect that the public voice will cheerfully acquiesce and concur in such pursuits as bid fair to terminate in the general good ?

With such accommodation of law, and such encouraging disposition of the public mind, Physicians will be without excuse if they do not harmonize among themselves, and begin the work of investigation with such liberal and beneficent views as shall evince that their concern for the public welfare is not mere pretence, but genuine and sincere.

Actuated by these motives of benevolence and under a determination to conduct and prosecute the inquiry with all the attentive diligence and perseverance which every important investigation demands, whatever may be the result, all will be ready to bestow their willing acknowledgment of WELL DONE ; and such honest endeavors must ever meet the sincere thanks of the wise and good.

